

US Patent Application Serial No. 10/056,151/09/921,022
Supplemental Amendment Dated 8/13/03
Reply to Advisory Action Dated 6/16/03

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method for reducing the slew rate of transition edges of a digital signal on a node of an integrated circuit, comprising:

connecting a first switchably conductive device characterized by a first threshold voltage between said node and a voltage source, said first switchably conductive device ~~responsive~~ having a control input connected to a first input signal to allow current conduction from said voltage source to said node when a voltage level of said first input signal is ~~offset from said voltage source by a voltage~~ substantially equal to and greater than said first threshold voltage and to disallow said current conduction when said voltage level of said first input signal is ~~offset from said voltage source by a voltage~~ less than said first threshold voltage;

connecting a second switchably conductive device characterized by a second threshold voltage greater than said first threshold voltage between said node and said voltage source, said second switchably conductive device ~~responsive~~ having a control input connected to a second input signal to allow current conduction from said voltage source to said node when a voltage level of said second input signal is ~~offset from said voltage source by a voltage~~ substantially equal to and greater than said second threshold voltage and to disallow said current conduction when said voltage level of said second input signal is ~~offset from said voltage source by a voltage~~ less than said second threshold voltage; and

connecting a driving signal as said first input signal of said first switchably conductive device and as said second input signal of said second switchably conductive device.

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2. (Currently Amended) A method in accordance with claim 1, comprising:

connecting between said node and said voltage source one or more additional switchably conductive devices each characterized by a respective threshold voltage different than said first threshold voltage, said second threshold voltage, and each other respective threshold voltage, each said one or more additional switchably conductive devices responsive having a respective control input connected to a respective input signal to allow current conduction from said voltage source to said node when a voltage level of said respective input signal is ~~offset from said voltage source by a voltage substantially~~ equal to and greater than said respective threshold voltage and to disallow said current conduction when said voltage level of said respective input signal is ~~offset from said voltage source by a voltage~~ less than said respective threshold voltage; and

connecting said driving signal as said respective input signal of said respective switch of each of said respective one or more additional switchably conductive devices.

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3. (Currently Amended) An apparatus for reducing the slew rate of transition edges of a digital signal on a node of an integrated circuit, comprising:

a first switchably conductive device characterized by a first threshold voltage, said first switchably conductive device connected between said node and a voltage source and responsive having a control input connected to a driving signal to allow current conduction from said voltage source to said node ~~when a voltage level of~~ said driving signal is ~~offset from said voltage source by a voltage substantially~~ equal to and greater than said first threshold voltage and to disallow said current conduction when said voltage level of said driving signal is ~~offset from said voltage source by a voltage~~ less than said first threshold voltage; and

a second switchably conductive device characterized by a second threshold voltage greater than said first threshold voltage, said second switchably conductive device connected between said node and said voltage source and

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responsive having a control input connected to said driving signal to allow current conduction from said voltage source to said node when a voltage level of said driving signal is ~~offset from said voltage source by a voltage~~ substantially equal to and greater than said second threshold voltage and to disallow said current conduction when said voltage level of said driving signal is ~~offset from said voltage source by a voltage~~ less than said second threshold voltage.

4. (Currently Amended) An apparatus in accordance with claim 3, wherein said first switchably conductive device comprises a single field effect transistor (FET) and said second switchably conductive device comprises a single field effect transistor (FET) ~~comprise field effect transistors (FETs).~~

5. (Currently Amended) An apparatus in accordance with claim 3, comprising:
one or more additional switchably conductive devices each characterized by a respective threshold voltage different than said first threshold voltage, said second threshold voltage, and each other respective threshold voltage, each said one or more additional switchably conductive devices connected between said node and said voltage source and responsive having a respective control input connected to said driving signal to allow current conduction from said voltage source to said node when said voltage level of said driving signal is ~~offset from said voltage source by a voltage~~ substantially equal to and greater than said respective threshold voltage and to disallow said current conduction when said voltage level of said driving signal is ~~offset from said voltage source by a voltage~~ less than said respective threshold voltage.

6. (Currently Amended) An apparatus in accordance with claim ⁵3, wherein said first switchably conductive device comprises a single field effect transistor (FET), said second switchably conductive device comprises a single field effect transistor (FET), and said one or more additional switchably

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conductive devices each comprises a single field effect transistor (FET) comprise
field effect transistors (FETs).

7. (Currently Amended) A method for controlling the slew rate of transition edges of a digital signal on a node of an integrated circuit, said method comprising the steps of:

driving, with a driving signal, a first switchably conductive device characterized by a first threshold voltage and connected between said node and a voltage source, said first switchably conductive device responsive having a control input connected to said driving signal to allow current conduction from said voltage source to said node when a voltage level of said driving signal is offset from said voltage source by a voltage substantially equal to and greater than said first threshold voltage and to disallow said current conduction when said driving signal is ~~offset from said voltage source by a voltage~~ less than said first threshold voltage;

driving, with said driving signal, a second switchably conductive device characterized by a second threshold voltage greater than said first threshold voltage and connected between said node and said voltage source, said second switchably conductive device responsive having a control input connected to said driving signal to allow current conduction from said voltage source to said node when said voltage level of said driving signal is offset from said voltage source by a voltage substantially equal to and greater than said second threshold voltage and to disallow said current conduction when said voltage level of said driving signal is offset from said voltage source by a voltage less than said second threshold voltage.

8-11. (Canceled)

12. (New) A method for reducing the slew rate of transition edges of a digital signal on a node of an integrated circuit, comprising:

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connecting a first switchably conductive device characterized by a first threshold voltage between said node and a voltage source, said first switchably conductive device having a control input connected to a first input signal to allow current conduction from said voltage source to said node when a voltage level of said first input signal is equal to and less than said first threshold voltage and to disallow said current conduction when said voltage level of said first input signal is greater than said first threshold voltage;

connecting a second switchably conductive device characterized by a second threshold voltage less than said first threshold voltage between said node and said voltage source, said second switchably conductive device having a control input connected to a second input signal to allow current conduction from said voltage source to said node when a voltage level of said second input signal is equal to and less than said second threshold voltage and to disallow said current conduction when said voltage level of said second input signal is greater than said second threshold voltage; and

connecting a driving signal as said first input signal of said first switchably conductive device and as said second input signal of said second switchably conductive device.

13. (New) A method in accordance with claim 12, comprising:

connecting between said node and said voltage source one or more additional switchably conductive devices each characterized by a respective threshold voltage different than said first threshold voltage, said second threshold voltage, and each other respective threshold voltage, each said one or more additional switchably conductive devices having a respective control input connected to a respective input signal to allow current conduction from said voltage source to said node when a voltage level of said respective input signal is equal to and less than said respective threshold voltage and to disallow said current conduction when said voltage level of said respective input signal is greater than said respective threshold voltage; and

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connecting said driving signal as said respective input signal of said respective switch of each of said respective one or more additional switchably conductive devices.

14. (New) An apparatus for reducing the slew rate of transition edges of a digital signal on a node of an integrated circuit, comprising:

a first switchably conductive device characterized by a first threshold voltage, said first switchably conductive device connected between said node and a voltage source and having a control input connected to a driving signal to allow current conduction from said voltage source to said node when a voltage level of said driving signal is equal to and less than said first threshold voltage and to disallow said current conduction when said voltage level of said driving signal is greater than said first threshold voltage; and

a second switchably conductive device characterized by a second threshold voltage less than said first threshold voltage, said second switchably conductive device connected between said node and said voltage source and having a control input connected to said driving signal to allow current conduction from said voltage source to said node when a voltage level of said driving signal is equal to and less than said second threshold voltage and to disallow said current conduction when said voltage level of said driving signal is greater than said second threshold voltage.

15. (New) An apparatus in accordance with claim 14, wherein said first switchably conductive device comprises a single field effect transistor (FET) and said second switchably conductive device comprises a single field effect transistor (FET).

16. (New) An apparatus in accordance with claim 14, comprising:

one or more additional switchably conductive devices each characterized by a respective threshold voltage different than said first threshold voltage, said

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second threshold voltage, and each other respective threshold voltage, each said one or more additional switchably conductive devices connected between said node and said voltage source and having a respective control input connected to said driving signal to allow current conduction from said voltage source to said node when said voltage level of said driving signal is equal to and less than said respective threshold voltage and to disallow said current conduction when said voltage level of said driving signal is greater than said respective threshold voltage.

17. (New) An apparatus in accordance with claim 14, wherein said first switchably conductive device comprises a single field effect transistor (FET) and said second switchably conductive device comprises a single field effect transistor (FET).

18. (New) A method for controlling the slew rate of transition edges of a digital signal on a node of an integrated circuit, said method comprising the steps of:

driving, with a driving signal, a first switchably conductive device characterized by a first threshold voltage and connected between said node and a voltage source, said first switchably conductive device having a control input connected to said driving signal to allow current conduction from said voltage source to said node when a voltage level of said driving signal is equal to and less than said first threshold voltage and to disallow said current conduction when said driving signal is greater than said first threshold voltage;

driving, with said driving signal, a second switchably conductive device characterized by a second threshold voltage less than said first threshold voltage and connected between said node and said voltage source, said second switchably conductive device having a control input connected to said driving signal to allow current conduction from said voltage source to said node when said voltage level of said driving signal is equal to and less than said second

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threshold voltage and to disallow said current conduction when said voltage level of said driving signal is greater than said second threshold voltage.

19. (New) An apparatus for reducing the slew rate of transition edges of a digital signal on a node of an integrated circuit, comprising:

a first field effect transistor (FET) device characterized by a first threshold voltage, said first FET device having a source connected to a voltage source, a drain connected to said node, and a gate coupled to a driving signal; and

a second FET device characterized by a second threshold voltage different than said first threshold voltage, said second FET device having a source connected to said voltage source, a drain connected to said node, and a gate coupled to said driving signal.

20. (New) A method for reducing the slew rate of transition edges of a digital signal on a node of an integrated circuit, comprising:

connecting a source of a first field effect transistor (FET) device to a voltage source, a drain of said first FET to said node, and a gate of said first FET to a driving signal, said first FET characterized by a first threshold voltage; and

connecting a source of a second field effect transistor (FET) device to said voltage source, a drain of said second FET to said node, and a gate of said second FET to said driving signal, said first FET characterized by a second threshold voltage different than said first threshold voltage.

21. (New) A method for controlling the slew rate of transition edges of a digital signal on a node of an integrated circuit, said method comprising the steps of:

driving a gate of a first field effect transistor (FET) device with a driving signal, said first FET device characterized by a first threshold voltage and having a source connected to a voltage source and a drain connected to said node; and

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driving a gate of a second field effect transistor (FET) device with said driving signal, said second FET device characterized by a second threshold voltage different than said first threshold voltage and having a source connected to said voltage source and a drain connected to said node.
